LISTING OF THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application:

Claims 1 through 65 (Cancelled).

66. (Previously presented) A device for the production of nuclear spin polarized fluids comprising:

an assembly for optical pumping a medium in a low pressure plasma to produce a polarized medium;

a compressor assembly connected to the optical pumping assembly for compressing the polarized medium; and

a storage volume connected to the compressor assembly for storing the polarized medium, wherein the compressor assembly comprises at least one ultra high vacuum (UHV) compatible lead through, including:

a housing;

a first space within the housing and connected via a first port to a space outside the UHV-compatible lead through;

a second space within the housing and connected via a second port to the optical pumping assembly;

a movable component separating the first space from the second space via an intermediate space; and

a seal for limiting a penetration of volatile media from the first space into the second space.

67. (Previously presented) A device according to claim 66, further comprising a plurality of first valves for coupling the assembly, the compressor, and the storage volume, wherein individual ones of the plurality of first valves include an ultra high vacuum (UHV) compatible lead through.

68. (Previously presented) A device according to claim 67, wherein individual ones of the plurality of first valves are gathered into valve blocks.

69. (Previously presented) A device according to claim 68, wherein the valve blocks further comprise intermediate vacua common for a number of first valves, and wherein the intermediate vacua are connected to each other via bores.

70. (Previously presented) A device according to claim 69, wherein at least one of the valve blocks comprise at least one of an inlet valve from the optical pumping assembly to the compressor assembly or an outlet valve from the compressor assembly into the storage volume.

71. (Previously presented) A device according to claim 69, wherein at least one of the valve blocks comprise at least one second valve for at least one of evacuating the optical pumping assembly, controlling flows of the polarized medium, or controlling pressure monitors.

72. (Previously presented) A device according to claim 67, further comprising a pipeline system for transport of the polarized medium and evacuation connected to the assembly, the compressor, and the storage volume, including little outgassing aluminum tubes, fastened by rings.

73. (Previously presented) A device according to claim 67, further comprising a getter that is selectively absorbing positioned in a flow ahead or after the optical pumping assembly.

74. (Previously presented) A device according to claim 73, wherein the getters comprise nonferromagnetic getter substances.

75. (Previously presented) A device according to claim 73, wherein the getters are evaporation getters.

76. (Previously presented) A device according to claim 74, wherein the nonferromagnetic getter substances comprise little relaxing titanium.

77. (Previously presented) A device according to claim 74, wherein the nonferromagnetic getter substances comprise bismuth.

78. (Previously presented) A device according to claim 75, wherein the optical pumping assembly comprises at least one evaporation getter.

79. (Previously presented) A device according to claim 78, wherein the at least one evaporation getter is part of the optical pumping assembly and is operated as a cathode in a plasma region of the optical pumping assembly in order to selectively bind gases other than the polarized medium.

80. (Previously presented) A device according to claim 75, wherein the evaporation getters comprise cooling set-ups.

81. (Previously presented) A device according to claim 72, further comprising a dead volume within each of

a cylinder head of the compressor;

at least one of the plurality of first valves coupling the compressor assembly to the storage volume; and

a portion of the pipeline system connected to the storage volume,

wherein each of the dead volumes are minimized in order to enable a fast and substantially complete polarized medium transport from the compressor assembly to the storage volume.

82. (Previously presented) A device according to claim 81, wherein the compressor comprises a stroke volume such that a fraction of gas remaining and relaxing in the dead volume is minimized.

83. (Previously presented) A device according to claim 67, wherein the compressor assembly comprises a compressor cylinder, and wherein a ratio of a circumference of the compressor cylinder to a stroke volume of the compressor assembly is smaller than about $1/(30cm^2)$.

84. (Previously presented) A device according to claim 67, wherein the optical pumping assembly comprises at least one long cell containing the optically pumped low pressure plasma.

85. (Previously presented) A device according to claim 84, the long cell comprises mirrors that serve to double an absorption path length of pumping light within the long cell, thereby conserving a degree of circular polarization.

86. (Previously presented) A device according to claim 85, wherein the mirrors are transparent for certain spectral lines of ^{3}He.

87. (Previously presented) A device according to claim 67, wherein the optical pumping assembly has a light source that has a spectral distribution that is adapted to a Doppler-width of an absorption line of a noble gas.

88. (Previously presented) A device according to claim 87, wherein the light source is a laser light source and for a given laser power the cross section of a laser beam emitted from said laser light source is formed such that a resulting light intensity will not surpass a saturation value of a maximum optical pumping rate.

89. (Previously presented) A device according to claim 84, wherein the optical pumping assembly comprises imaging optical elements arranged outside the at least one long cell in order to focus a beam from a light source of the optical pumping assembly such that a cross section of the beam remains smaller than a cross section of the at least one long cell in order to prevent depolarizing reflection from walls of the at least one long cell.

90. (Previously presented) A device according to claim 84, wherein at least an entrance window and an outlet window of the at least one long cell include glass of optical quality.

91. (Previously presented) A device according to claim 90, comprising an element for determining a degree of circular polarization of light, wherein the degree of circular polarization is determined by taking a difference of a maximum and a minimum measured voltage value and dividing it by their sum, wherein these voltage values are obtained by passing the light first through a $\lambda/4$ retardation plate followed by a liquid crystal element and finally a linear polarizer after which the light generates in a photo detector a first voltage value, and wherein the first voltage value is the maximum or the minimum measured value depending on a positive or negative voltage signal applied to the liquid crystal element which reacts by forming a bi-refringent optical delay plate having delays of either an even or an odd multiple of half of a wave length $\lambda/2$ or vice versa.

92. (Previously presented) A device according to claim 91, wherein the element for determining the degree of circular polarization determines a degree of nuclear polarization of a noble gas plasma.

93. (Previously presented) A device according to claim 66, wherein the optical pumping assembly comprises at least one high frequency driven electrode powering the low pressure plasma.

94. (Previously presented) A device according to claim 69, wherein the intermediate vacua are connected to the optical pumping assembly.

95. (Previously presented) A device according to claim 94, further comprising a purification assembly for purifying a gas pumped out of the intermediate vacua, and wherein the purified gas is recycled within the device.

96. (Previously presented) A procedure for producing nuclear spin polarized gasses comprising:

optically pumping a gas in a low pressure plasma to produce a polarized gas;

mechanically compressing the polarized gas using a fractional pumping method; and

transporting the gas into a storage volume.

97. (Previously presented) A procedure according to claim 96, wherein the fractional pumping method is performed by an ultra high vacuum (UHV) compatible lead through including:

a housing;

a first space within the housing and connected via a first port to a space outside the UHV-compatible lead through;

a second space within the housing and connected via a second port to a closed system containing the polarized gas;

a movable component separating the first space from the second space via an intermediate space; and

a seal for limiting a penetration of volatile media from the first space into the second space.

98. (Previously presented) A procedure according to claim 96, wherein the production of the nuclear spin polarized gases is performed using a device comprising:

an assembly for optical pumping gasses in a low pressure plasma to produce polarized gasses;

a compressor assembly for compressing the polarized gases; and

a storage volume for storing the polarized gasses, wherein the compressor assembly comprises at least one ultra high vacuum (UHV) compatible lead through, including:

a housing;

a first space within the housing and connected via a first port to a space outside the UHV-compatible lead through;

a second space within the housing and connected via a second port to the device;

a movable component separating the first space from the second space via an intermediate space; and

a seal for limiting a penetration of volatile media from

the first space into the second space.

99. (Previously presented) A procedure according to claim 97, further comprising actively pumping the intermediate space.

100. (Previously presented) A procedure according to claim 96, wherein the gas is purified of contaminants by getter devices before and/or during at least one of optical pumping or compression.

101. (Previously presented) A procedure according to claim 100, wherein the getter devices are cooled.

102. (Previously presented) A procedure according to claim 101, wherein the getter devices are cooled to a temperature of liquid nitrogen.

103. (Previously presented) A procedure according to claim 96, wherein mechanically compressing is performed by a single compressor up to a pressure of less than 10 bar.

104. (Previously presented) A procedure according to claim 96, wherein the fractional pumping method yields noble gas and the procedure includes:

purifying and recycling the noble gas; and

producing polarized noble gas.

Claims 105 through 111 (Cancelled).

112. (Previously presented) A device according to claim 67, wherein the compressor assembly comprises a compressor cylinder, and wherein a ratio of a circumference of the compressor cylinder to a stroke volume of the compressor assembly is smaller than about $1/(100cm^2)$.

113. (Previously presented) A device according to claim 67, wherein the compressor assembly comprises a compressor cylinder, and wherein a ratio of a circumference of the compressor cylinder to a stroke volume of the compressor assembly is smaller than about $1/(300\ cm^2)$.